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09/605,289	06/28/2000	Pamela R. Lipson	TER-008PUS	5923

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EXAMINER	
CHAWAN, SHEELA C	
ART UNIT	**PAPER NUMBER**
2625	11

DATE MAILED: 02/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/605,289	LIPSON ET AL.	
	Examiner	Art Unit	
	Sheela C Chawan	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Jan9, 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17,19-28, 45- 48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12,15-17,19-27 and 45-48* is/are rejected.

7)☒ Claim(s) *13, 14 and 28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on Jan 9, 2004 (paper # 9/B) has been entered and made of record.

In response to arguments presented (Jan 9, 2004, paper # 9/B), reconsideration of the finality of the rejection of the last office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Objections

2. Claim 18 is objected to because of the following informalities:

Claim 22 depends upon the canceled claim 18.

Appropriate correction is required.

Claim Rejections - 35 U.S.C. § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1- 12, 15-16 and 45- 48 are rejected under 35 U.S.C. 102(e) as being anticpated by O'Dell et al. (US.6,324,298).

As per claims 1 and 45, O'Dell discloses an inspection system comprising:

(a) a database having stored therein a package library (the package library includes information regarding the object such as size of the object , die fig 3, item A2 , define the product geometry , fig 3, item A3, die pitch , database fig 2, item E, column 5, lines 25- 29, column 11, lines 55- 62);

(b) an inspection plan generator coupled to receive information from said database and for generating an inspection plan (fig 2, item B , inspection plan based on creating inspection recipe for wafer , column 6, lines 65- 67, column 7, lines 1-22).

(c) an image processing system including an image capture processor (column 10, lines 30 - 35) , an image processor and (column 5, lines 1-4, column 7, lines 3- 46) ; and

(d) an inspection module, coupled to said image processing system, said inspection module including (column 5, lines 1-4, column 7, lines 3- 46):

a learn model (fig 3, item A1) processor for learning and saving attributes about the appearance of parts and for generating image (column 7, lines 23- 46), structural (fig 3, item A2 , defining the wafer product based on geometry, die size, die pitch etc) and geometric models from data gather (geometric model is defined as wafer having rough location and rotation data provided by the previous two model and it determines a precise location of the part on object by inspecting , column 4, lines 50 -59, column 7, lines 3-22, fig1, wafer alignment device 16, fig 2, step A 2).

an image model processor (column 4, lines 27- 30) determining a presence of an object within a region of interest (fig 1, camera 20 , column 7, lines 8-10);

a structural model processor (column 7, lines 3- 22) determining structural features of the object (fig 1, parameter input device 22, fig 2, step A2); and

a geometric model processor (geometric model is defined as wafer having rough location and rotation data provided by the previous two model and it determines a precise location of the part on object by inspecting , column 4, lines 50 -59, column 7, lines 3-22) determining a precise location of the object (fig1, wafer alignment device 16, fig 2, step A 2).

As per claim 2, O'Dell discloses the system wherein said image model processor comprises:

an image model (column 4, lines 27- 30) ; and

means for applying the image model to an image of an object being inspected to determine if the part being inspected looks like parts that have been seen in the past (column 7, lines 5- 46) .

As per claim 3, O'Dell discloses the system wherein the at least one attribute corresponds to one of color or luminance (column 10, lines 1- 15, column 19, lines 34-55).

As per claim 4, O'Dell discloses the system wherein said image model comprises at least one attribute arranged in a fixed spatial manner (column 7, lines 5- 8) .

As per claim 5, O'Dell discloses the system wherein said structural model processor comprises;

a structural model (column 4, lines 60- 63); and

means for applying said structural model to an image of an object being inspected to determine whether a part exists in the image that has tile same structure as that encoded in said structural model (column 7, lines 23- 46).

As per claim 6, O'Dell discloses the system wherein said structural model comprises:

a set of regions (column 17, lines 39-53); and

a set of relations between predetermined ones of the set of regions (column 17, lines 39- 63) .

As per claim 7, O'Dell discloses the system wherein a set of relations included in the structural model includes relative color relations between predetermined regions of the structural model (column 10, lines 1- 15, column 19, lines 34- 55).

As per claim 8, O'Dell discloses a system wherein said geometric model processor comprises:

a geometric model (geometric model is defined as wafer having rough location and rotation data provided by the previous two model and it determines a precise location of the part on object by inspecting, column 4, lines 50- 59, column 7, lines 3- 22) ; and

means for applying the geometric model to an image of an object being inspected to determine part placement details (fig 1, wafer alignment device 16, fig 2, step A2).

As per claim 9, O'Dell discloses the system wherein said means for applying the geometric model to an object comprises means for searching for one or more edges or one or more gradient regions of the object with the constraint that the pattern of the one or more gradients match a top level configuration (column 12, lines 20- 28, column 16, lines 31-65, column 17, lines 39- 53).

As per claim 10, O'Dell discloses the system wherein said geometric model utilizes gradients in at least one of luminance or color to precisely locate the object being inspected (column 10, lines 1- 15, column 19, lines 34- 55).

As per claim 11, O'Dell discloses the system wherein said means for searching includes means for simultaneously searching for one or more edges or one or more gradient regions of the object (column 12, lines 20- 28, column 16, lines 31-65, column 17, lines 39- 53).

As per claim 12, O'Dell discloses inspection module comprises: to-update one or more of predetermined image, a learn model (fig 3 item Ai) processor for learning and saving attribute, about the appearance of parts and for generating image (column 7, lines 23- 46), structural (fig 3, item A2, defining the wafer product based on geometry, die size, die pitch etc) and geometric models from data gather (geometric model is defined as wafer having rough location and rotation data provided by the previous two

model and it determines a precise location of the part on object by inspecting , column 4, lines 50 -59, column 7, lines 3-22, fig1, wafer alignment device 16, fig 2, step A 2).

As per claim 15, O'Dell the system wherein said new model or set of models (column 19, lines 43- 49) include at least one of an image model (column 7, lines 23- 46), a structural model and a geometry model for an object being inspected.

As per claim 16, O'Dell the system further comprising a theta estimator for reducing the range of angles over which a model is applied (column 4, lines 50- 55, column 19, lines 33- 55) .

As per claim 46, O'Dell discloses the inspection system wherein said learn model processor provides structural (fig 3, A2, column 19, lines 33- 55), and geometric models (column 4, lines 56- 59, column 7, lines 3- 46) by updating existing structural and geometric models with attributes generated by said learn model processor (fig 1, wafer alignment device 16, fig 2, step A2).

As per claim 47, O'Dell the inspection system wherein said structural model processor reduces the number of parameters considered by said geometric model processor(column 5, lines 49- 55, column 7, lines 23- 46).

As per claim 48, O'Dell the inspection system wherein said learn model processor evaluates a plurality of values for a plurality of parameters in each of a structural model and a geometric model and said learn model processor determines which set of values provides an acceptable separation function (column 12, lines 10- 18, 43- 54, column 17, lines 22- 28).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(a) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 17,19 –27, are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Dell et al. (US.6,324,298), as applied to claims 1- 12, 15-16, 45- 48 above and further in view of Reinholt G et al. " unified feature defination for feature based design and feature based manufacturing ".

As per claim 17, O'Dell teaches a method for inspecting an object comprising the steps of:

(a) applying a first model (plurality of known good die, and for mining a model within computer system is considered to be first model, column 19, lines 33- 55, column 20, lines 8- 36) having a first set of attributes to a region of interest around the object (column 7, lines 3- 46, column 12, lines 43- 68, column 13, lines 1 – 12, 36- 48, column 14, lines 5- 36, column 19, lines 33- 55, column 20, lines 8- 36) ; and

(b) applying a second model to the region of interest around the object (plurality of known good die, and for mining a model within computer system is considered to be second model, wherein the second model has a second set of attributes wherein the second set of attributes differs from the first set of attributes by at least one attribute (column 7, lines 3- 46, column 12, lines 43- 68, column 13, lines 1 – 12, 36- 48, column 14, lines 5- 36, column 19, lines 33- 55, column 20, lines 8- 36).

O'Dell discloses defect inspection systems for the semiconductor industry it relates to automated inspection equipment, systems and processes. O'Dell is silent about applying a third model to the region of interest around the object.

Reinholt G. et al. discloses " unified feature defination for feature based design and feature based manufacturing ". The system comprises of:

(c) applying a third model to the region of interest around the object (fig 1, section 1.1). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified O'Dell to include a third model to the region of interest around the object . It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified O'Dell by the teaching of Reinholt in order

to provide a feature based system, allowing of both components and assemblies (as suggested by Reinholt at section 1.2).

As per claim 19, O'Dell discloses the method wherein:

the first model corresponds to one of an image model (fig 3, item A1, column 5, lines 5- 10, column 7, lines 23- 46) and a structural model ; and

the second model corresponds to one of a structural model (fig 3, item A2) and a geometry model (fig 2, step A2, column 4, lines 50- 59, column 7, lines 3- 46) column 5, lines 25- 30).

As per claim 20, O'Dell discloses the method wherein the step of applying the first model reduces the number of parameters (column 7, lines 23- 46) considered by the second model (column 5, lines 49- 55, column 12, lines 60- 67, column 13, lines 1- 12 ,column 14, lines 51- 57).

As per claim 21, O'Dell discloses the method wherein the parameters are rotation and translation of the object (column 5, lines 25- 29, column 9, lines 38- 57) .

As per claim 23, O'Dell discloses the method wherein the step of applying an image model comprises the step of applying the image model to a region to determine if an object being inspected looks like objects on which the model has been trained (column 7, lines 5-46).

As per claim 24, O'Dell discloses the method wherein the step of applying a structural model comprises the step of applying the structural model to determine whether an object exists in the region of interest that has the same structure (column 4, lines 60- 63) as that encoded in the structural model (column 7, lines 23- 46).

As per claim 25, O'Dell discloses the method wherein the step of applying a geometry model comprises the step of applying the geometry model to precisely locate the object and to provide detailed information concerning the placement of the object (fig 1, item 16, fig 2, step A2, column 4, lines 50- 59, column 7, lines 3-22) .

As per claim 26, O'Dell discloses the method further comprising the steps of:

(d) prior to applying the first model, annotating a package library (fig 3, item A1, column 9, lines 1-6);

(e) generating an inspection plan (fig 2, item B , inspection plan based on creating inspection recipe for wafer , column 6, lines 65- 67, column 7, lines 1-22);

(f) implementing a learning process (column 4, lines 50- 59, column 7, lines 3-22) ;

(g) applying the first model to a test data set (column 17, lines 5- 22)

; and

(h) applying the second model to the test data set (column 20, lines 21-36).

As to claim 22, see the rejection of claim 17 above.

As per claim 27, Reinholt discloses the method further comprising the step of applying a third model to the test data set (section 3.3.5) .

Allowable Subject Matter

5. Claims 13, 14, 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Other prior art cited

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Horowitz (US.4,802,230) discloses method ansd apparatus for generating size and orientation invariant shape features.

Sandland et al. (US.4,644,172) discloses electronic control of an automatic wafer inspection system.

Gallarda et al.(US.6,539,106B1) discloses feature-based defect detection.

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheela C Chawan whose telephone number is 703-305- 4876. The examiner can normally be reached on Monday through Thursday 7.30 a.m. to 6.00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta, can be reached on (703) 308 - 5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3800.

SCC
Sheela Chawan
Patent Examiner
Group Art Unit 2625
Feb 12, 2004

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